McMaster University

Family Medicine

David Braley Primary Care Research Collaborative

Choosing the appropriate statistical test

Larkin Lamarche (they/them)

Presentation objectives

- Understand prerequisites for choosing the appropriate statistical test:
    - Research question
    - Study design
    - Type of measurement
    - Database set-up
- Understand some basics to screening your data and assessing assumptions for a statistical test
- Choose the appropriate statistical test: a demo of StatXFinder

Plug-ins

- Basic and Advance Research Designs for Primary Care Research (Ric Angeles)
- Just the Basics: Learning about the essential steps to do some simple things in SPSS (Larkin Lamarche & Melissa Pirrie)
- Online stat book
- StatXFinder
- OpenEpi

Building blocks

The prerequisites

- Research question
- Study design
- Type of measurement
- Database set-up

The prerequisites: Research question

- How the question is phrased signals the types of tests that might be appropriate
- Describing, predicting, relating, comparing
- Common to phrase the question that doesn't align with design and analysis
    - Watch for words like "increase/decrease"
    - Causation versus relationship language ("impacts, effects" versus "related to")

The prerequisites: Study design

- One-to-one correspondence between the design (and methods) of the study and the statistics used to analyze it!
- Answers to some of these questions
    1. How many variables do you have?
    2. Do you have groups? How many?
    3. Are groups independent or paired?
    4. When, how many times were outcomes collected?

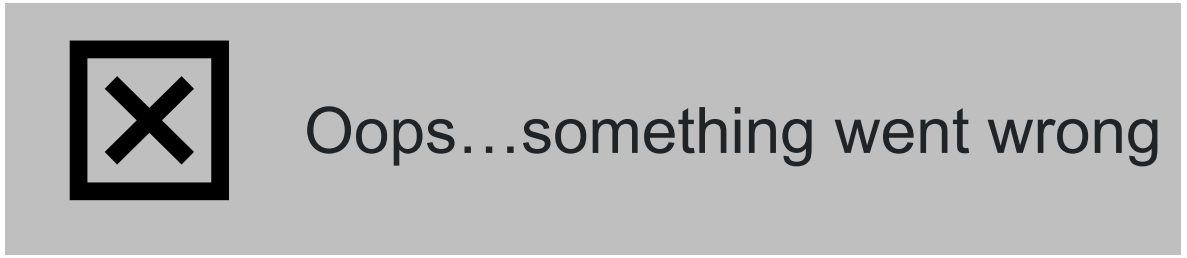
Basic and Advance Research Designs for Primary Care Research (Ric Angeles)

The prerequisites: Type of measurement

1. Qualitative: number is associated with a word of qualifier
    - Discrete: Categories given to a variable; implies no direction
    - Ordinal: Responses are ranked; difference between two points different meaning
2. Continuous: numerical data that can theoretically be measured in infinitely small units
    - Interval: Responses are ranked; difference between points has same meaning; no true zero
    - Ratio: Interval scale with a true zero

Online Stat Book -> Introduction -> Levels of Measurement (also with a 12:35 video)

The prerequisites: Database set-up



- If your database is not set up correctly and you use a statistical software, the only thing you will find is an error message (p <.05, definitely!)
- Check levels of measurement, scoring of variables, linked (paired) data

Building blocks

- Screening your data
- Assessing assumptions

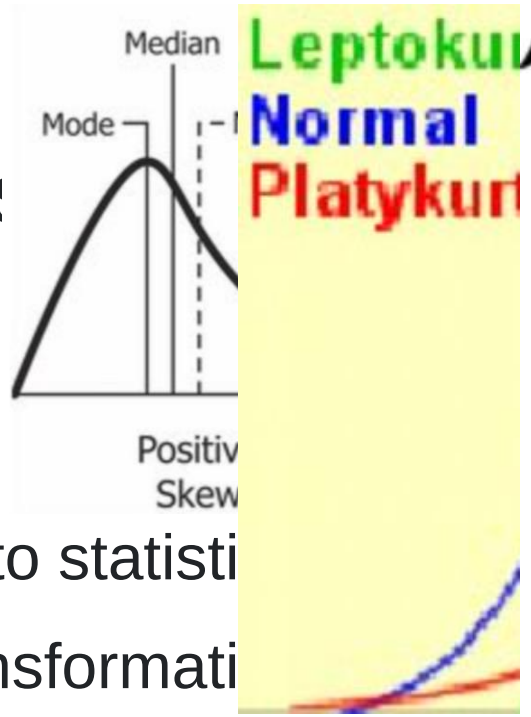
Screening data

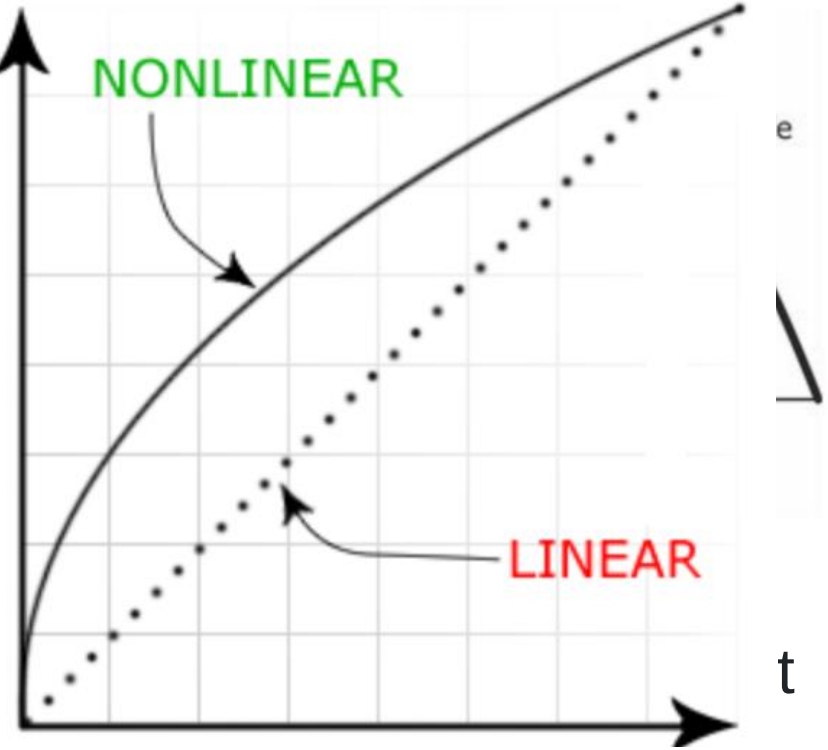
- Data entry errors
- Patterns of missing data
- Forgetting to reverse-code survey responses (where applicable)
    - Cronbach's alpha

Just the Basics: Learning about the essential steps to do some simple things in SPSS (Larkin Lamarche & Melissa Pirrie)

Assessing assumptions

- "normal" distribution
  - Skewness, kurtosis
  - Outliers, leverage
- Linearity
- Google assumptions related to statisti
- Violation of assumptions=transformati





Online Stat Book -> Introduction -> Distributions (with a 6:03 video)
Online Stat Book -> Summarizing distributions -> shape (with a 3:06 video)

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Finally! Choosing the most appropriate test

StatXFinder demo

StatXFinder demo

- A decision support tool for appropriate statistical test selection
- Homepage (https://medinfo.deu.edu.tr/statxfinder/index.php)
- Suner, A., Karakülah, G., Koşaner, Ö., & Dicle, O. (2015). StatXFinder: a web-based self-directed tool that provides appropriate statistical test selection for biomedical researchers in their scientific studies. SpringerPlus, 4(1), 1-13.
- Next version will be about multivariate statistical tests

StatXFinder